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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/752,386	01/06/2004	David V. Horak	FIS920030114US1 (16509)	6830

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EXAMINER
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LOKE, STEVEN HO YIN

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/752,386

Applicant(s)

HORAK ET AL.

Examiner

Steven Loke

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 13-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4 and 6-12 is/are rejected.
- 7) ☒ Claim(s) 3 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date: _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/6/04</u>  | 6) <input type="checkbox"/> Other: _____                                    |

1. Applicant's election without traverse of claims 1-12 in the reply filed on 1/25/05 is acknowledged.
2. Claims 13-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1/25/05.
3. The abstract of the disclosure is objected to because the phrase "the second layers" (line 6) has no antecedent basis. It is believed that the word "region" (line 9) should change to "regions". Correction is required.
4. The disclosure is objected to because of the following informalities: In paragraph [0024], line 3, the phrase "an as" is not understood.  
  
Appropriate correction is required.
5. Claims 2-4 and 8-12 are objected to because of the following informalities: Claim 2, line 3, the phrase "the liner" has no antecedent basis; lines 5-6, the phrase "a source and drain regions extension" is unclear whether it is being referred to "source and drain extension regions". Claim 4, line 2, the phrase "the source and drain extension region" is unclear whether it is being referred to "source and drain extension regions". Claim 8, lines 13-14, the phrase "a doped source and drain extension region" is unclear whether it is being referred to "doped source and drain extension regions". Appropriate correction is required.
6. Claims 8-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8, line 11, the phrase "removing...liner" is unclear as to the claim never discloses a liner formed in the device. It is also unclear where is the liner being formed in the device.

Claim 9, line 2, the phrase "the source-drain extension region" is unclear whether it is being referred to the doped source and drain extension regions of claim 8.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 2 and 4 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Yeap et al.

In regards to claim 1, Yeap et al. show all the elements of the claimed invention in figs. 10-18. It discloses a method of forming a doped gate structure on a semiconductor device [60], comprising the steps: providing a semiconductor device [60] including a gate dielectric layer [66]; forming a gate stack [64, 68] on said dielectric layer [66], including the steps of forming a first gate layer [64] on the dielectric layer, and forming a second layer [68] on top of the first gate layer; forming a spacer [84] around the first and second layers [64, 68]; and removing the second layer [68].

Since a top surface of the polysilicon gate layer [64] is exposed to the external environment, the first gate layer [64] is also implanted with ions during the source/drain

regions [90, 92] implantation step. Therefore, a doped gate layer [64] formed above the gate dielectric layer [66].

In regards to claim 2, Yeap et al. further disclose the spacer [84] is a first spacer, and further comprising the steps of: removing a portion of the first spacer (from [84] to [88], figs. 14 and 15) and a portion of the liner (from [76] to [86], figs. 13 and 14); forming a second spacer [70], thinner than the first spacer [84], around the gate stack; and implanting further ions (the ions in regions [72, 74]) in the semiconductor device, around a portion of the second spacer [70], to form source and drain extension regions [100, 102] in the semiconductor device, around the second spacer [70].

In regards to claim 4, Yeap et al. further disclose the step of: forming a third spacer [82] around a portion of the gate stack [64, 68] and above the source and drain extension regions [100, 102].

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeap et al.

In regards to claim 6, Yeap et al. differ from the claimed invention by not showing the spacer [84] is comprised of silicon oxide.

It would have been obvious for the spacer is silicon oxide because it is a conventional sidewall spacer material. It also would have been obvious for the spacer

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comprised of silicon oxide, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. In re Leshin, 125 USPQ 416.

In regards to claim 7, Yeap et al. differ from the claimed invention by not showing the first gate layer has a height of about 150 nm and the second layer has a height of about 150 nm.

It would have been obvious to one having ordinary skill in the art at the time the invention was made for the first gate layer has a height of about 150 nm and the second layer has a height of about 150 nm, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d272, 205 USPQ 215 (CCPA 1980). In addition, it also depends on the desired size of the device.

11. Claims 3 and 5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claim 8 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, and the objection set forth in this Office action.

13. The following is a statement of reasons for the indication of allowable subject matter: The first major difference in the claims not found in the prior art of record is the step of removing the first spacer occurs after the step of implanting ions in the first gate layer. The second major difference in the claims not found in the prior art of record is the second layer is comprised of polygermanium.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (571) 272-1657. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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March 4, 2005

Steven Loke